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EDITORIAL

"VIRTUALLY THE HISTORY OF AMERICAN PHARMACY."

So reads a caption used in calling the attention of the profession to the Historical Volume of the Philadelphia College of Pharmacy, now in press and shortly to be ready for distribution. And the phrase is significant and true. For it is well known that the first page of the History of American Pharmacy was written by the Apothecaries of Philadelphia when they established, in 1821, the College of Apothecaries, later the Philadelphia College of Pharmacy and still later the Philadelphia College of Pharmacy and Science.

The sturdy apothecaries of the City of Brotherly Love builded better than they knew, for as years merged into decades and the decades into a century, the College which they founded came to be recognized as the pre-eminent institution of pharmaceutical learning in the country. From its doors have gone thousands of trained men, many of whom have writ large their names upon the scroll of human service.

Pharmacy and the allied sciences owe much of their advance to the efforts of her graduates. In the service of the Federal and State governments graduates of this College have been of assistance in helping to bring about important legislation relating to pharmacy and the compounding and dispensing of drugs. The educating of pharmacists throughout the country at large has been well shared in by men who went out of this pioneer institution. Its contribution towards making the Pharmacopœia of the United States the peer of such books of official standards is no unworthy record.

In short, the history of this unique institution is the story of a progressive enterprise, progressive because of the foresight of its charter members and because of the unflinching adherence of those

who "carried on" to the straight-from-the-shoulder policies of its Quaker founders.

This Centennial History of the Philadelphia College of Pharmacy, to be issued by the College, records the story of the institution in an interesting and detailed fashion and no pharmacist or pharmaceutical manufacturer or any one connected with the profession can afford to be without a copy. The work is appropriately and profusely illustrated, many of the pictures being taken from rare prints, photographs and paintings. An idea of the comprehensive nature of this volume may be had by scrutinizing the following brief survey of its contents:

Chapter I—Philadelphia and Pharmacy in 1821.

Philadelphia in 1821, Pharmacy in 1821, Separation of Pharmacy from Medicine, Manufacture of Pharmaceuticals, Manufacture of Medicinal Chemicals, Manufacture of Technical Chemicals, Establishment of Drug Milling, Pharmaceutical Events in 1821.

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A blank for the convenience of prospective subscribers is furnished elsewhere in the advertising pages of this issue.

I. G.

ORIGINAL PAPERS

MODERN ILLUMINATION OF AGE-OLD PROCESSES.*

By F. P. Stroup, Ph. M.

Professor of General Chemistry, Philadelphia College of Pharmacy and Science.

This paper is an attempt, on the part of the author, to bring to his hearers and readers, in as simple language as he can command, an interpretation of the meaning of some of the terms which they are meeting every day in their scientific and semi-scientific literature. He will be amply rewarded if, as the result of this effort, a few persons will be able to read with pleasure and profit more of the articles and discussions published in books and periodicals than they could read intelligently heretofore.

Chemical processes have been going on since time began, each one in its own particular way. When man came upon the stage he, doubtless, began to take notice of many of these processes, and, being a reasoning animal, began to try to explain how and why chemical changes took place. Chemical phenomena have not changed through the ages, but man's interpretations of them have been changing constantly. During the less than fifty years of the existence of this Association there have been wonderful changes, in a forward direction, of means for the production of artificial illumination, and man has not been slow to adopt each new or improved method as it was brought to his attention. During the same period there have been no less wonderful changes in man's conception of the why and wherefore of natural processes, essentially chemical, yet many persons have been very slow to change from the ideas they formed when they first studied chemical science. Despite the fact that the new ideas explain simply and satisfactorily many phenomena inexplicable by the older theories, there are still many persons who seem to reason "the old is good enough for me," and many who regard the new as "high-brow stuff," too complicated for any but the best equipped (from the mental standpoint) to master. The first attitude of mind we cannot

*Read at the 1922 Meeting of the Pennsylvania Pharmaceutical Association.

combat, but we are going to attempt to show that much of this so-called "high-brow stuff" is capable of being easily understood. Instead of following the conventional free lecture style to "get our message across" we are going to conduct a quiz, using hypothetical questions answered by as direct answers as we can give.

QUESTION: What is meant by the terms "Ionization" and "Electrolytic Dissociation"?

ANSWER: These are terms given to the change which many compounds are believed to undergo when they dissolve in certain liquids, particularly water. According to the Ionic Theory

Acids, in the presence of water, yield positively charged hydrogen (H) ions (Hydrion) and negatively charged simple or compound anions, each acid having its characteristic anion.

$$HCl = H^+ + Cl^-; \quad HNO_3 = H^+ + NO_3^-;$$
$$H_2SO_4 = H^+ + H^+ + SO_4^{--};$$

Bases, in the presence of water, yield negatively charged hydroxyl (OH) ions (Hydroxidion) and positively charged simple or compound cations, each base having its characteristic cation.

$$KOH = K^+ + OH^-; \quad NH_4OH = NH_4^+ + OH^-;$$
$$Ca(OH)_2 = Ca^{++} + OH^- + OH^-;$$

Salts, in the presence of water, yield positively charged cations and negatively charged anions, other than Hydrion and Hydroxidion, the composition of which are dependent upon the acid and base to which the salt, in each case, is chemically related.

$$NaBr = Na^+ + Br^-; \quad NH_4H_2PO_2 = NH_4^+ + H_2PO_2^-.$$

Q. Solution having been effected, is ionization complete?

A. No, except in dilute solution and, even then, it depends on the nature of the compound dissolved. In very concentrated solutions the degree of ionization may be practically nil. There is greater uniformity among salts as regards degree of dissociation than among acids and bases. Certain acids (hydrochloric, hydrobromic, hydriodic, nitric, sulphuric, for example) ionize quite freely in comparatively concentrated solution, and completely in dilute solution, and, because of this fact, are called "strong acids"; while other acids (phosphoric, hydrofluoric, boric, carbonic and most organic acids, for example) ionize but sparingly, even in very dilute solution, and are

known as "weak acids." Bases which ionize freely (the hydroxides of potassium, sodium, calcium, barium and strontium, for example) are called "strong bases"; while those which ionize sparingly (the hydroxides of ammonium and most of the metals, and the alcohols, for example) are called "weak bases." Most salts, even those related to "weak bases," "weak acids," or both, ionize quite freely, though not so strongly as the "strong" bases and acids.

Q. Why is it that concentrated sulphuric acid may be stored and shipped in iron containers, while the diluted acid cannot?

A. The acid properties of an acid are dependent mainly upon the H ions which it liberates in the presence of water. The concentrated acid is not ionized and so has no effect on the metal, while the diluted acid contains H ions which can and do give up their positive electric charges to atoms of iron which then become ions and go into solution. The hydrogen atoms combine to form molecules of the element, which are gaseous at ordinary temperatures.

Q. Why do some acids seem less sour in taste than others, even when of the same alkali-neutralizing power, and why do some acids (boric, for example) taste not at all sour?

A. The sour taste is due to H ions. "Strong" acids (hydrochloric, for example) contain more H ions per unit of volume than "weak" acids (acetic, for example), hence have a more intense taste. Boric acid ionizes so slightly in the saliva and produces so few H ions that their taste is not perceptible.

Q. Why do aqueous solutions of some salts (the carbonates, normal phosphates, borates, silicates, acetates and other organic salts of potassium and sodium, for example) have an alkaline reaction?

A. Because the water has brought about a so-called "hydrolytic dissociation," followed by ionization, resulting in a predominance of OH ions, the cause of alkalinity. Example: Sodium carbonate, in the presence of water, forms some sodium hydroxide and an equivalent amount of carbonic acid. $Na_2CO_3 + 2H_2O = 2NaOH + H_2CO_3$. The former ionizes more strongly than the latter; result, an excess of OH ions. Where hydrolytic dissociation (also called "hydrolysis") results in the formation of a "strong" base and a "weak" acid the resulting solution is always alkaline.

Q. Why do solutions of some salts (the chlorides, nitrates, sulphates of zinc, aluminum, copper and iron, for example) have an acid reaction?

A. For the reason given under the previous question, except that the result of the hydrolysis in each instance is a "weak" base, yielding few OH ions, and a "strong" acid, yielding many H ions,—a preponderance of H ions, the cause of acidity.

Q. How does the Ionic theory explain neutralization reactions?

A. The H ions of the acid solution and the OH ions of the alkali solution combine to form un-ionized water, the anions of the acid and the cations of the alkali remaining, for the most part, in solution until the solvent is removed by evaporation, or otherwise. when they combine to form a salt. $Na^+ + OH^- + H^+ + Cl^+ = H_2O + Na^+ + Cl^+$. As fast as H ions and OH ions combine others are liberated from the acid and alkali, respectively, until both have been completely dissociated and the resulting H and OH ions have all combined as water.

Q. Does water not ionize at all?

A. Chemically pure water has never been obtained, because of the solvent action of this substance on the gases of the air and other gases, as well as on all solids which might be used in the manufacture of containers; but it has been calculated that ten million liters of chemically pure water, at ordinary temperatures, would contain 1 gram (1.008, to be exact) of H ions and 17 grams (17.008, to be exact) OH ions. Its hydrogen ion concentration would be ten-millionth normal, or 10^{-7}, or pH_7, or P_{H_7}. Its hydroxyl ion concentration could be expressed in the same way. Water of this purity would represent absolute neutrality; the H ions would exactly balance the OH ions. $H_2O = H^+ + OH^-$.

Q. What is meant by the term "normal" as applied to solutions used in volumetric chemical analysis?

A. A normal solution of an acid contains in each liter one (1.008, to be exact) gram of acidic hydrogen, not necessarily as H ions; a normal solution of an alkali contains in each liter 17 (17.008) grams basic hydroxyl, not necessarily as OH ions. A given volume of any normal alkali solution will just exactly neutralize an equal volume of any normal acid solution. A normal solution of any compound, other than acid or alkali, contains in each liter, or is capable of liberating from each liter, an amount of oxygen or some other element chemically equivalent to one gram of hydrogen.

Q. What is meant by the term "Hydrogen Ion Concentration"?

A. The strength of a solution or mixture in terms of H ions. One gram of H ions in a liter is a normal solution, one gram in ten liters (or 100 milligrams in one liter) is a decinormal solution (tenth normal).

Q. Is there not a better system of nomenclature than this? It would seem that this system, being used as it is in the naming of volumetric solutions, would lead to some confusion.

A. Your point is well taken. One or another of several other systems is generally used. In one system a normal solution is designated numerically as 1.0; a decinormal solution, 10^{-1}; a centinormal solution, 10^{-2}; a ten-millionth normal, 10^{-7}, etc. By another system a normal solution is designated as 1.0; a decinormal solution by pH_1 or P_{H_1}; a centinormal solution by pH_2 or P_{H_2}; a ten-millionth normal solution by pH_7 or P_{H_7}, etc.

Q. What is the difference in the use of the term "normal" as applied to volumetric solutions and the same term as applied to the H ion concentration of a solution or mixture?

A. This question, perhaps, can be best answered by use of a non-chemical illustration, followed by a concrete chemical example. A normal army may have in it 10,000 men,—a fighting line of 1,000, backed up by the other 9,000. The fighting is done by the thousand in the front lines, and only as some of them drop out do the others get a chance to fight. The thousand represent the fighting-man concentration, the ten thousand the total man concentration of the army. Six per cent. Acetic Acid corresponds to Normal Acetic Acid Volumetric Solution (it contains in each liter 60 grams absolute acid [Molecular Weight of Acetic Acid is 60], of which one gram is *acidic* hydrogen). But six per cent. Acetic Acid is only about 10 per cent. ionized, hence its H ion concentration is only about one-tenth of its acidic hydrogen strength; so, while acid of this strength is *normal* for volumetric analytical purposes, its H ion concentration is only *decinormal*, 10^{-1}, or P_{H_1}.

Q. Why the negative exponent in 10^{-1}, 10^{-2}, 10^{-7}, etc.?

A. It is the mathematical method of expressing the reciprocal (opposite) of the power of a number. Illustration: 10^2 means 10 raised to the second power, or 100; 10^{-2} is the reciprocal, or 1/100th.

Q. I have noted that fiftieth normal is expressed as $10^{-1.7}$ or $pH_{1.7}$. Is that not a mistake? Should it not be 1.5?

A. The figure is correct. It is the logarithm of the number which is the denominator of the fraction which indicates the concentration.

1 is the logarithm of 10, 1.7 is the abbreviated log of 50, 1.9 is the abbreviated log of 80, and 2 is the log of 100.

Q. You have said that absolute neutrality is represented by pH_7. What, then, is meant by pH_{12}?

A. The product of the H ions and OH ions in any sample of water is a constant. If more OH ions be added, say by the addition of some KOH solution, the increase of OH ions is compensated for by a decrease of H ions, and the product of the two remains unaltered. The alkalinity of a solution can thus be expressed in terms of acidity (H ion concentration). A normal alkali solution has a pH value of 14, and a centinormal solution of alkali can be rated as pH_{12}. It will be seen that the higher the figure the lower is the H ion concentration. A change of one integer downward means a change of ten times the strength upward.

Q. How may the H ion concentration of a solution or mixture be determined?

A. A very accurate and quick method, one which has many advantages over any other known method, depends upon the use of electrical apparatus by means of which the conducting power of the solution or mixture is determined. The expense of the apparatus is the chief drawback to its general use. A much cheaper method, one which is sufficiently accurate for most purposes, depends upon the use of a series of so-called "indicators," each of which changes color within a fairly narrow range of H ion concentrations. For example:

1. Bromphenol blue is yellow at $pH_{2.8}$ and blue at $pH_{4.6}$;
2. Methyl red is red at $pH_{4.4}$ and yellow at $pH_{6.0}$.

Suppose that separate portions of a solution have been tested with these two indicators, and the portion with No. 1 shows blue, and the one with No. 2 shows red. The conclusion must be that the H ion concentration of the solution is between 4.6 and 6.0.

Q. What is a so-called "Buffer"?

A. A substance which prevents more than slight, if any, change in the H ion concentration of a solution when acid or alkali is added

to a solution or developed within it. One drop of a weak solution of hydrochloric acid added to pure water may alter the pH value several integers. Should sodium phosphate or sodium bicarbonate be present, the effect would be slight. Alkali phosphates, carbonates, borates and citrates are among the best buffers. Proteins and amino-acids also are good, and these are among the natural buffers that are found in animal fluids, and help to keep biological processes from being disturbed by the formation of acids through errors in diet, disease, etc.

Q. Can you give us some instances where correct H ion concentration determines the success or failure of a process?

A. Factors which disturb the H ion concentration of the blood and other body fluids lead to ill health and, often, death. Micro-organisms of various kinds (bacteria, ferments) and even the higher plants, require culture media or soil of the proper H ion concentration for normal development. It has been suggested that traces of impurities in many compounds might be easily detected by use of H ion concentration measurement methods, particularly the electrolytic method.

ALCOHOL IN PHARMACY.

John Uri Lloyd, Ph. M., Cincinnati, Ohio.

"My Dear Mr. Editor:

"Perhaps I may best reply to the question you ask me regarding alcohol in pharmacy, by quoting from some of my old contributions to the *Eclectic Medical Journal,* which have not, so far as I know, drifted into pharmaceutical journalistic print. In some directions, as I read these over, revisions might be made, as is natural when one considers that the first was written forty-five years ago, but as a whole they might, in my opinion, stand as written.

"Believing that if you have the time to read these over they will practically cover the questions asked of me. I am

"Sincerely yours,

"(Signed) John Uri Lloyd."

Editor's Note.—Nearly a half century has rolled by since Professor Lloyd penned the following contribution, but we frankly believe with the Professor that these *old* writings carry much that just at present is considered as "new thought" and also much that will give text for "advanced thought" to persons concerned in therapeutic pharmaceutical progress.

Alcohol Adversely Criticised.*†

Unless the pharmacist has made himself as nearly as possible conversant with the properties and chemical attributes of the substances that are naturally associated within the bark along with the glucoside, and is consequently enabled in preparing his pharmaceuticals to elminate materials from his preparation that have proved themselves incompatible with the glucoside, we cannot say he has proved himself a master of his profession or made himself of much benefit to physicians in respect to this class of materials. Even though he may *truly* claim for his preparation that each minim represents completely the medicinal principles of one grain of the crude material, and that every fluid ounce contains the *entire* virtues of one troy ounce of the specified drug, still other than in the slight advantage which would arise from a mere change in form, his pharmaceutical is not superior to the crude drug.

However, some may take issue with me upon this point, and pointing as an example to the fluid extracts now so popular, say—"Are not the soluble principles of the drugs separated from the insoluble and inert materials which accompany them? Are not the insoluble and useless materials, such as lignin, cellulose, starch, etc., eliminated from fluid extracts?" And I will answer, yes. Here I can agree with you, for in this respect you have improved upon nature, but although you have separated these substances, you have added a foreign material that is, in overdoses, *more to be disapproved of than the inert wood and starch,* which at the utmost are merely objected to because they are worthless and tend by their presence to render the administration of the crude drug unhandy, perhaps a little slow in action in consequence of serving as an envelope to the medicinal principles of the drug, and thus preventing them from coming in contact immediately with the juices of the stomach.

But on the other hand, the substance you have replaced them by is a powerful medicine of itself. I know physicians will generally agree with me, for although under certain circumstances it may not prove objectionable, in some cases it is decidedly to be disapproved

*Part of an article in which the glucoside was the substance in hand, not the alcohol.

†From *Eclectic Medical Journal,* 1875.

of. I will warrant that every doctor who reads this article can recall to mind instances where he would have preferred that his patients should have taken two teaspoonfuls of starch rather than one teaspoonful of alcohol. But we shall come to this in its proper place.

(From Eclectic Medical Journal, 1889.)

I will admit in accepting the fact that alcoholic liquid representatives of plants are often desirable, we are being drawn in some directions over broken ground. In my opinion we should differentiate more; the rule of elaboration is usually a good one, but there are many exceptions to the employment of an alcoholic menstruum in plant extraction. The thrusting of a line of alcoholic fluid extracts (followers of the mediæval alcoholic tinctures and essences) upon the profession has been conducive to injury as well as benefit.

Manufacturers and physicians together have broadly accepted in this direction without proper discrimination, and if my opinions are worthy of consideraton, a halt should be called by physicians. . . . The introduction of a line of substances known as fluid extracts, made practically by a universal rule, has led, I believe, to some marked disturbances of this nature. Drugs that cannot properly be extracted with an alcoholic menstruum are often thrust forward as unquestionably represented in an alcoholic form.

Take, for example, the mucilaginous bark of the elm, a drug that should be stripped fresh from the tree, torn into shreds and suspended in cold water in order to produce the soothing, cooling mucilaginous drink that is so refreshing to feverish patients. Its richness depends on its freshness. Each day this infusion should be prepared anew, and the vessel containing it should be kept in a cold situation outside of the sickroom to avoid absorption of foul exhalations.

Is it not illogical to substitute for that mucilage a burning alcoholic "fluid extract" that neither can contain the mucilage of the bark nor replace to the parching patient the grateful drink that may be prepared from fresh elm?

Pass to the other drugs somewhat of this description, comfrey, benne, quince seed, chestnut, and the same rule may be applied. The fresh infusion made with cold water is the best preparation, and every drop of alcohol added is at the expense of the value of the preparation. I do not hesitate to say, in my opinion, a so-called fluid extract or tincture of such a drug is not a desirable preparation. . . .

I rebel against such preparations as fluid extract of Kino and fluid extract of Catechu, and have displeased some patrons by refusing to make them. Other cases can be cited in which such inconsistencies occur, but it is unnecessary, although I might say that in my opinion a decoction of Apocynum is effective where an alcoholic preparation is useless, and that the elaborate formula of the United States Pharmacopœia, 1880, produces a fluid extract of chestnut far inferior to an infusion of chestnut leaves. . . . I freely say that in my opinion this fluid extract hobby has been carried in some directions too far.

The apothecary, the manufacturer, the physician, seem to have crushed themselves together and regardless of compatibles or incompatibles, of consistency or of inconsistencies, have *rushed headlong into an alcoholic craze*. Deserving and commendable in many particulars, objectionable in others, I view fluid extracts as one of the stepping stones to a more perfect pharmacy, which, by a series of evolution, will produce (to be followed by) substances that will surely displace them in the future. They are a crudeness of the present, although they have improved our medicines in some directions by displacing others more crude, or given us more portable preparations. But they have in many instances crowded our shelves with preparations very much inferior to the decoctions and infusions, or even to the crude drugs, that have been displaced.

I do not propose to try to defend myself for the part I have taken in this record, for I do not deny that my zeal in the past has helped to fasten the habit on others, neither do I close my eyes to the fact that many manufacturing pharmacists and their friends may even now decline to accept the situation as I see it.

(From the Proceedings of the Ohio Pharmaceutical Association, 1889.)

The careful apothecary is often confronted with possibilities that the thoughtless may overlook and which an inexperienced druggist may never comprehend. I shall refer now more particularly to the changes that take place in preparations after they are made and while they remain in our hands; changes that may result in a continued variation of drug action from time to time. By reason of this variation the physiological force and therapeutic action of many medicines must surely with all physicians be more or less of an uncertainty.

We do not necessarily have to seek in out-of-the-way places for examples illustrative of the foregoing idea. Indeed, scarcely a day passes that the writer is not called upon to study the matter in one or more of its unrecorded, connected phases, and probably other persons are continually confronted with problems of a like nature.

There are various known causes for these changes in properties of pharmaceutical preparations, familiar examples being the action of light on mixtures containing some compounds of iron, especially phosphate, pyrophosphate and citrate; the slow disorganization of alkaloidal solutions (elixirs perhaps) of slight alkaline reaction; the decomposition and subsequent precipitation of acid solutions containing bismuth salts which often remain transparent for a considerable time and then suddenly fly to pieces, etc., etc.

These familiar examples may be named as preliminary to the consideration of others less known, among which I will mention the action of light on many organic solutions exposed thereto and the questionable power of *alcohol* in maintaining the medicinal force of some organic substances that are soluble in that menstruum. Passing the former (influences of light) I will in this paper confine myself to the latter, which many persons have, I believe, overlooked entirely. Indeed, I have never seen a reference thereto.

By way of a comparison, it may be stated that while it is true that alcohol has the power of suspending acetous fermentation when the alcohol is in *large amount*, it is no less true that in *smaller amount* it is an acceleration of such fermentation, being then a food of the ferment. Thus, vinegar of a quality that is unbearably sour, is practically made by gradually adding whiskey to weak cider, in which case the alcohol reverses its character and becomes a producer of acetic acid instead of a protector against acetification. Pass, however, that phase of the subject, which is well understood, and consider alcohol in quantities so great as to forbid the chance of acetic fermentation, and I am by no means convinced that in other directions it is the uniform preservative that some persons believe it to be. Upon the contrary, it has gradually dawned on my mind, from consideration of alcoholic solutions of many substances, that many bodies readily disintegrate in its presence.

True it is that albuminous substances are coagulated and cannot putrefy when immersed in alcohol, this illustration being typical of its preservative power in that direction and an example that prob-

ably prevents our questioning its power in others, by quieting suspicion. If the brain of a man be placed in a jar and covered with alcohol, it becomes hard, brittle, contracts by loss of water and is indefinitely preserved in its shrunken form; but even here I question if structural changes do not also occur to alter normal conditions. Water of structural life is not water alone. While the form structures of most anatomical specimens are preserved by alcohol by reason of its action on muscle and albumen, I question if their normal interstructural characters remain intact, even though putridity is prevented. Admit that the spirit has prevented putrefaction, has induced albuminous coagulation and acted as a common preservative in this instance in one prominent direction, the question remains unanswered as to its full power of preventing alteration of other substances in other directions.

In this field there may be an element of uncertainty where we have thoughtlessly passed without a question. Most organic bodies are susceptible of alterations that are not explainable as yet by recorded experiments. These changes take place either in the presence or absence of alcohol and may serve as visible illustrations of the subject under consideration, to a few of which I may properly direct your attention.

If certain (most) fresh herbs in a closed jar be impregnated with alcohol by pouring a small amount of alcohol into the jar filled with the herbs, and then agitating until the herbs are thoroughly saturated with the alcohol, it will be found that they lose their green color in a few hours, turning brown. The chlorophyl perishes rapidly in those parts of the plants above the surface of the alcohol, while those beneath its surface sometimes remain green a considerable time, imparting their cholorophyl to the alcohol.

Instead of preserving the chlorophyl in the parts of the plants above the liquid, the alcohol with which they are saturated hastens their decomposition, and a parallel experiment with a like jar of herbs without alcohol shows they will retain their green color long after the specimens saturated with alcohol have become brown or yellowish brown.

This experiment is easily performed and will illustrate the fact that under certain conditions plant constituents dissociate with increased rapidity in the presence of alcohol, which becomes then an accelerator of decomposition, and what is shown by the *seen* may

perhaps indicate what occurs at the same time in other constituents of that plant structure with the unseen. It is more than likely that simultaneous dissociations take place in other plant constituents; indeed, from my present view there is no question on this point.

Make a tincture of the fresh green herb by covering it with alcohol, macerating it a short period and quickly filtering. The tincture will at first be of a rich green. Place it aside. Examination from time to time will show a gradual change to brown and at last the green color may disappear entirely, a red-brown liquid being the result.[1]

It may be argued by some persons that in this instance the destruction of chlorophyl is immaterial since chlorophyl is of no medicinal value. Accepting this view, we may, however, use the striking exhibition of alteration in color thus showing destruction of chlorophyl to permit us to question as to whether at the same time, as already stated, *unseen* dissociations may not be taking place in other directions. We thus may be induced to make comparisons of the results of continued investigations which formulated into a whole become of service.

Pass from fresh plants to those that are dry, for many persons, accepting the Pharmacopœia as infallible, will refuse to accept as medicines other than those made from dry drugs. The precipitates that occur in tinctures and fluid extracts in the presence of an abundance of alcohol illustrate the fact that changes of some description are continually taking place in them.[2]

The sudden decomposition of fluid extract of Geranium maculatum, the complete disintegration of fluid extracts of Stillingia, Iris versicolor, Epigea repens and many others, whereby nearly all of the soluble solid constituents precipitate, indicate that alcohol fails to preserve these liquids from alteration. That these changes are partly of a chemical nature is indicated by the fact that astringency of the liquid then disappears, while the resultant magma is free from astringency with Geranium, Stillingia, Iris and others, and no part

[1] The presence (influence) of water derived from the herb must not be overlooked in this instance. However, the large amount of alcohol present does not act as a preservative.

[2] I do not overlook the phase of the subject contributed by me to the American Pharmaceutical Association in a series of papers some years ago entitled "Precipitates in Fluid Extracts," in which it was shown that natural laws necessarily produce many precipitates that are not dependent on any chemical alteration of plant constituent.

of entire material after decomposition is possessed of its former characteristic properties. Neither the serum that suspends it nor any other menstruum will re-dissolve this precipitate.

The gelatinization of tincture of Kino and Catechu are familiar to all persons and as we consider the subject in its familiar phases the lesson seems to be, interstructural alterations that ordinary amounts of alcohol fail to interrupt changing reactions often in constant process and that these alterations may even continue to the utter destruction of the natural association of the educts originally held by the alcoholic liquid.

We have so far considered only the alterations that *visibly* affect a plant solution and these have been cited as examples because they unmistakably illustrate what may take place in other directions in which the appearance of the liquid is not altered. Reasoning from the facts deduced from a study of the visibly known, it is probable that unseen changes fully as important may be occurring in other directions. Indeed, there is every reason to infer that rearrangements of integral constituents may be continually at work in many alcoholic liquids, the result often being the production of new *soluble* bodies. Owing to the fact that there are no chemical tests for the majority of fluid extracts, these conditions can only be determined by sensible methods. A fluid extract might become dismembered so far as its original organization is concerned, and this fact remain hidden from observation if the resultant products are of the same color and soluble in the same menstruum. Indeed, I am sure that many substances do thus disappear in the presence of even strong alcohol. Of course, the highly developed alkaloids are not likely to undergo much alteration, if any, but many very potent medicinal agents surely disappear entirely. Indian turnip covered with alcohol becomes insipid;[3] alcohol will not preserve its acrid tincture. Tincture of Rhus toxicodendron, intensely poisonous when first made,[4] gradually loses its virulence and at last is practically worthless. Tincture of Anemone pulsatilla loses its anemonin gradually and should never be carried over a season. Even a pure solu-

[3] Alcohol as shown by Prof. Maisch will not dissolve its acrid constituents.

[4] I make several barrels of this tincture each year at the proper season, from fresh herb, because the dry drug is worthless, using strong pressure and alcohol enough to make a very strong product. Each succeeding year I expect to throw into the discard a large amount of this tincture to replace with new crop.

tion of anemonin in official alcohol disintegrates; it cannot be thus preserved. Other examples might be cited to show that energetic soluble principles of plants are not altogether protected from change by alcohol. After considerable attention in this direction I have accepted that we may well study alterations in alcoholic plant preparations with more than usual profit.

To sum up: In my opinion, any cause for uncertainty in the therapeutic power of a pharmaceutical preparation demands the attention and investigation of apothecaries and pharmacists. Alterations that occur in these preparations render the practice of medicine proportionately uncertain. Only by studious attention in the direction indicated in this paper can we hope to determine the extent of such alterations, and these studies with many preparations *must* be made before we can expect to correct the matter. In order to aid the physician, whose skill in diagnosing disease is valueless without uniformly active remedies to meet symptoms of disease expression, we must consider the foregoing subject in connection with others that also render remedies uncertain.

Finally, I must conclude that physicians have much with which to contend from variation of medicinal power of many of the fluids that are made from different qualities of drugs and by different applications of skill in working the same. In some important cases they also have to contend with liquids that are reliable when first made, but become worthless through age, regardless of the skill and care of the operator. In most cases these liquids are dispensed in full faith of their reliability, by reason of the confidence we have in the preservative power of alcohol.

STANDARDS OF DELETED PREPARATIONS.*

By Otto Raubenheimer, Ph. M., Brooklyn, N. Y.

According to the Pure Food and Drug Act, drugs must comply with the standard laid down in the U. S. P. and N. F. The question arises: "How about drugs and especially preparations which have been deleted from the U. S. P. and N. F.?"

The deletions and admissions in the U. S. P. are decided by the Sub-Committee on Scope, mostly composed of physicians, and it is

*Presented at the Fifty-second Annual Meeting of the N. J. Ph. A. at Lake Hopatcong, June, 1922.

perhaps not more than proper that the medical profession shall decide to some extent what their medical material should be. The deletions and admissions in the N. F. are decided by the entire N. F. Committee of fifteen, fourteen of which are pharmacists and one a doctor. In both instances, in the U. S. P. as well as the N. F. the deletions and additions are based on two very important principles, namely *therapeutic activity and pharmaceutic necessity*. Either one, or both factors decide admissions or deletions.

Illustration: The much talked of Elixir Digestivum Compositum N. F. III was deleted because the Council on Pharmacy and Chemistry of the American Medical Association insisted that it was a therapeutic incompatibility. To satisfy the medical authorities the N. F. Committee deleted this elixir. The preparation, however, is a pharmaceutic necessity, as it is constantly ordered on prescriptions, and is just as popular today as it was years ago when official.

When the physician orders Elixir Digestivum Compositum he expects to receive the preparation with which he is acquainted, the preparation which was official in the last N. F., the preparation which contains pepsin, pancreatin and diastase. But does the patient get this particular preparation of that particular strength? No sooner this or any other preparation is deleted, many manufacturers or many druggists adopt different formulas which *yield not better, but cheaper preparations*. Money talks, even as to medicine, I am sorry to say. No doubt, the honest, conscientious pharmacist will always dispense the particular preparations which the physician has in mind, the preparations which have a standard either in present or former editions of the U. S. P. or N. F., be they Compound Digestive Elixir, Elixir of Three Phosphates, Iodine Liniment, Fleming's Tincture of Aconite or Magendie's Solution.

It is universally understood that drugs or preparations must comply with the *standards of the latest editions of the U. S. P. and N. F.* It is not so well understood that deleted preparations should also comply with the standards in which they were last official. I would, therefore, respectfully suggest that the New Jersey Pharmaceutical Association should pass a resolution somewhat as follows:

"We recommend that the members of the N. J. Ph. A. adhere to the formulas and standards of the U. S. P. and N. F. also in those cases when a preparation is deleted, so as to produce uniformity in medicine."

MISLEADING ADVERTISEMENTS.*

By Louis Gershenfeld, Ph. M., B. Sc., P. D.

Professor of Bacteriology and Hygiene, Philadelphia College of Pharmacy and Science.

Your attention has been directed, from time to time, to misinformation both in advertising and labeling, and misrepresentation, adulteration and contamination of products sold on the market. The writer feels that considerable good has come out of suggestions which were introduced for the benefit of all concerned by the exposure of this information and he is, therefore, taking the liberty of bringing to the attention of this body additional information along similar lines, which should prove of value.

It is a common practice for many manufacturers, both small and large, but generally the former, to introduce insecticidal preparations and market them also as efficient germicides, inasmuch as it seems to be a better advertising and selling point to have this on the label and in advertising data. You are perhaps well aware that the traffic of insecticides and germicides comes under direct control of the Insecticide and Fungicide Board of the Department of Agriculture. The duty of this board is to promulgate rules and regulations for the protection of manufacturers and the public in general, so that one can be assured that insecticides and germicides placed on the market are actually fit to be employed as the particular manufacturer advises. This particular board apparently has had its hands full and has not perhaps been able to reach all products coming under its direct control.

It may be safely said that the pharmaceutical, chemical and medical professions have been more careful than others, with the result that misleading statements on labels and in advertisements are not as numerous as they have been heretofore. There, however, seems to be one profession, if it may be regarded as such, which has been neglected by those whose duty it is to safeguard the health and welfare of all concerned. The writer refers to the undertaking and embalming profession. It has been his pleasure to closely observe the workings and happenings in this line and was astonished to note the misleading data which circulates in certain corners, which in many instances places an individual in a position that he may jeopard-

*Read at the 1922 Meeting of the Pennsylvania Pharmaceutical Association.

ize his own health as well as the health and welfare of the community wherein he may be found.

It may be interesting to observe, for instance, the labels on embalming fluids which are placed on the market by apparently reputable manufacturers. Embalming fluids are regarded, as they should be, as disinfectants. Is it not to be desired that the manufacturer of embalming fluids shall lay claim to statements which are truthful and not misleading as is expected of manufacturers in other industries? To be specific, may I call your attention to the label of an embalming fluid which is extensively advertised. We find on such label the following:

> **Directions for Use.**
>
> To make one gallon of peroxide fluid of standard strength for arterial embalming, mix the contents of this bottle with seven pints of water. To make one-half gallon of the strongest formaldehyde fluid for drowned, dropsical, cancerous, and such cases, mix the entire contents of this bottle with three pints of water.

It may be possible for such statements to be overlooked by the individual whose knowledge in chemistry and allied sciences is almost nil, but should that be the reason for a nanufacturer to try to put something over on individuals who are not trained along such lines? Does he really expect or think that such misleading statements can really go on forever? It would be interesting to hear how one can make individuals believe that from the same bottle he can so dilute the contents of the latter as to obtain two products of varied and different chemical content. He attempts to persuade one to believe that in the one instance, by adding three pints of water to the contents in the bottle, the end product which he regards as the strongest formaldehydre fluid obtainable is the result, and if we add an additional four pints of water "a peroxide fluid is produced." We can readily see that the chemical knowledge possessed by this manufacturer must be far from extensive, he not knowing the simple incompatibility of peroxide and organic matter.

Eventually this embalming fluid manufacturer may be able to change gold into silver or silver into gold. For centuries and centuries our alchemists have been attempting to do that which appar-

ently the undertaker is doing every day, if we should believe such statement.

Is it possible that our Government authorities or those States that have passed laws in regard to truthful advertising will always ignore or constantly overlook such a misleading statement or ask for an explanation of how the wonderful combination of water with any product can change the same product into an entirely different composition merely upon dilution?

Other than this erroneous statement by what reasoning can one assume that in diluting the contents of the bottle containing embalming fluid with three pints of water, the strongest formaldehyde solution can be obtained? Surely if only one pint of water was used as a diluent or if no water at all was employed, we would have a formaldehyde fluid which would be stronger than that obtained by diluting as directed.

This product was advertised in the June issue of a leading undertaking journal and the following information, directed apparently to the undertakers, was given:

"Many, if not most, fluid manufacturers have been striving for years to put into each bottle of their product the greatest possible amount of disinfecting material, losing sight of every other consideration in what seemed to them to be the vital and important thing—preservation.

"It never seems to have occurred to them that after you have poisoned a germ with chemicals, it is totally unnecessary to hit it over the head with an axe, to cut its throat, blow out its brains, take it down to the river and drown it, and then drag out the body and tie it to the rails and let the Broadway Limited crush it out of all semblance to its former self.

"When you have used a disinfecting chemical powerful enough to destroy a germ you have done all that is necessary. If you want to increase the efficiency of your fluid beyond that, why not give it extra powers of Penetration, so that it can seek out the germs in all the hidden nooks, corners and crannies of the body and get there with enough power to destroy them as well?"

Those of you who have observed the development of modern business methods and advertising have observed that honesty is the first essential which is asked for throughout; truth in advertising is demanded, and such is especially the case when a product is sold

to an individual who does not understand or does not care to understand the intricate details which one must consider in producing a satisfactory combination in embalming fluids, disinfectants, insecticides, etc.

A number of apparently well advertised disinfectants have been found to have very little if any disinfectant value. Such preparations were directed to be used in diluted form for the washing of cadavers, disinfection of bed linens, gloves, instruments and the hands of the embalmer. Another preparation advertised apparently as a disinfectant and insecticide and used as a disinfectant was found to be mainly an insecticide and practically no disinfectant value was found in such product.

There seems to be only three possible avenues for the ratification of remarks passed to any trade by individuals who either unconsciously introduce such remarks or purposely pass them on for the purpose of deceiving every one.

First, an important step has been taken by most reputable newspapers and magazines; that is, to refuse to accept advertisements in which statements have been made that are untruthful, especially when such statements have been brought to the attention of the editors or the publishers of such periodicals. The other is for the manufacturers themselves to associate themselves into one conbined force and attempt by some method or other to introduce a co-ordinating or co-operative method of assisting or aiding the trade or profession and through their particular circles they may take such action as they may be compelled to against their members or non-members who insist upon introducing remarks that are not truthful. The last and the one method which must be finally employed, when all others fail, is to appeal to the consumers regarding such misstatements. It does not require much knowledge or common sense for one to be able to question statements that are so radically wrong. It must not be forgotten that the public after all is indirectly being served by the manufacturer who sells his embalming fluids and other supplies to the undertaker. Empty containers frequently get into the hands of the laymen, some of whom are better versed in the chemical knowledge of such materials than the undertaker or embalmer who actually employs them and it must not be forgotten that very frequently, by such misrepresenta-

tion, an undertaker may be jeopardizing his future career, especially if he will be unable to satisfactorily explain statements made on labels of materials which he employs in the regular routine as required in his profession.

It can readily be observed where misstatements on embalming fluids and disinfectants may lead such manufacturers to be inconsistent in their statements on other products that they may introduce on the market and one therefore is justified in assuming that any manufacturer who misrepresents one article will undoubtedly misrepresent other articles that he may attempt to sell. It would be only proper that the pharmacist and those of us whose duty it is to analyze as well as to determine the efficiency of these products shall inform the consumers as to the value of products available on the market. The only protection that an undertaker or embalmer or any consumer really has is the honesty and truthfulness and high ideals of the reputable manufacturers who are in back of their products. If we could put the buyer on his guard and warn him to select products on which truthful statements are made on labels, our efforts would be repaid in many ways.

It is because of the misdeeds of the few that Government regulations become necessary. Manufacturers and others who honestly and conscientiously attempt at all times to serve the public generally do not and will not fear any legislation that may be promulgated by the State and by our Government for our own benefit.

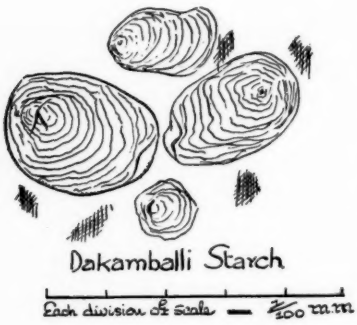
ABSTRACTED AND REPRINTED ARTICLES

DAKAMBALLI STARCH.*

A sample of this starch was received from Dr. Vevers, of British Guiana, through the Wellcome Bureau of Scientific Research. It is prepared by the Indians of British Guiana from the fruit of the

*Reprinted from *The Analyst.*

tree *Aldina insignis,* and is used by them as a remedy for dysentery, being administered in the form of a mucilage made by boiling the starch in milk or water.



The starch was of pale brown color and, on examination under the microscope, was seen to consist entirely of starch granules varying in mean diameter from 11 to 42 micromillimetres. The small granules were mostly circular, a few being truncated and the larger ones roughly ovate. The hilum was at the broader end, and the concentric rings were well marked. The material was tasteless.

On analysis the following results were obtained:

	Per Cent.
Moisture	19.57
Fat	0.04
Proteins N × 6.25	1.25
Crude fibre	0.10
Matter soluble in alcohol	trace
Matter soluble in cold water	"
Ash	0.21
Starch, by difference	78.83
	100.00

The amount of starch directly estimated by the method of Davis and Daish (*Journal of Agricultural Science,* 1914, 6, 152) was 76.1 per cent.

No alkaloids or cyanogenetic glucosides could be detected in the sample.

It is well known that mucilaginous substances are sometimes effective remedies in colitis and certain forms of diarrhœa and dysentery, and it is not surprising, therefore, that a mucilage made from clean starch such as this should prove equally useful.

J. A. Goodson.

Wellcome Chemical Research Laboratories,
6 King Street, Snow Hill, E. C. 1.

THE LIFE AND WORK OF EMILE BOURQUELOT.*†

Elie-Emile Bourquelot was born at Jandun, in the Ardennes, in 1851, and educated in Charleville. After the disastrous Franco-German war of 1870 he entered the Pharmacie Loret, in Sedan. In the selection of this pharmacy Bourquelot was fortunate, for Loret was a pharmacist who held his profession in high esteem, and made his own galenical preparations with conscientious care. Bourquelot frequently expressed profound gratitude for the instruction received from his chief. "I owe him," he said, "all the instruction I have had in my profession, and I do not in the least regret having under his direction folded packets, used the pestle, and cleaned basins. I profit every day in my own laboratory by his instruction. I owe him above all the love that I preserve for our profession."

During his apprenticeship Bourquelot was attracted to the study of botany, and particularly to field botany, making frequent botanical rambles, and even establishing a small association of six Sedan apprentices with the object of making botanical excursions on their days of leisure. The third year of his apprenticeship was passed at Rheims, and Bourquelot then went to study at the École Supérieure de Pharmacie, in Paris. Here he was awarded the gold medal for practical botany in 1875, the silver medal for chemistry in 1876, the silver medal for physics in 1877, and also the gold medal for students of the third year. In 1875 he entered the Hôpital de la Pitié as "internat," choosing this hospital on account of its proximity to the Botanical Gardens, which allowed of his continuing his studies in natural science. In 1877-1878 he was chief of the laboratory of biological chemistry in the hospital. From 1878 to 1919 he occupied the post of hospital pharmacist in various hospitals. In the École Supérieure de Pharmacie he held in succession the posts of Préparateur des Travaux de Chemie, Préparateur des Cours de Cryptogamie, and Chef des Travaux de Micrographie. In 1880 he graduated as Licencié ès Sciences Naturelles, in 1882 as Pharmacien de 1er Classe, and in 1885 as Docteur ès Sciences Naturelles. In 1897 he was appointed Professeur de Pharmacie Galénique.

*Abstract of "Notice sur la Vie et les Travaux de Emile Bourquelot," by J. Bougalt et H. Hérissev. Société Générale d'Imprimerie et d'Edition, 17 Rue Cassette, Paris, 1921.

†Reprinted from the *Pharm. Journ. and Pharmacist.*

During the period of his greatest activity Bourquelot had a double function to fulfil, *viz.*, that of Professor of Galenical Pharmacy at the École Supèrieure de Pharmacie and that of Pharmacien at the Hôpital Laennec. With characteristic unselfishness he gave up his laboratory at the École de Pharmacie mainly to students who wished to work under his direction, while he himself worked in a small laboratory in the hospital. Establishing himself midway between these two institutions, he reached the hospital every day about 8.30, and left again at 12, returning at 1.30, and leaving at 7. After dinner a light was usually visible in his laboratory or private room from 8 till 10. He thus set an example of assiduous work to all his pupils. Those of the latter who wished to do so were allowed to take part in his work according to their ability. With them he frequently made excursions into the environs of Paris for the purpose of collecting the plants necessary for his researches, and these excursions were made an opportunity for discussing various subjects in natural history.

Bourquelot's lectures were prepared with the greatest care. The necessary information was acquired from the original memoirs, and rested therefore on a sure foundation. The instruction was always kept abreast of the progress in his subject, and no new feature that constituted progress in pharmacy was neglected. He even went so far as to have in the lecture theatre an immunized horse from which the blood necessary for the preparation of sera was drawn.

In his scientific researches Bourquelot had numerous collaborators. Foremost among these were H. Hérissey and M. Bridel, the former working with him for nearly twenty-seven years and the latter for fifteen years. Both of these scientists testify to Bourquelot's conscientiousness, to his marvellous gift of attracting men to scientific work, to the broadness of his views, and to his horror of loudly-proclaimed generalizations based upon an insufficient number of experiments. One of his chief characteristics was the care he took to be sure of his observations.

Although a member of numerous scientific societies, Bourquelot was most intimately connected with the Société de Pharmacie de Paris, of which he was a member for thirty-eight years, and of which he became President in 1898. In 1888 he acted as assistant editor of the *Journal de Pharmacie et de Chimie*, and from 1905 to 1919 as chief editor. This occupied a good deal of his time and handicapped

him in his laboratory work, a disadvantage which was to some extent compensated for by the necessity for his keeping himself posted in all pharmaceutical publications. As editor he exercised a somewhat severe censorship on the articles that he allowed to appear, for all those that were a more or less disguised form of advertisement or that were insufficient from a scientific point of view were rigorously excluded. At the same time he kept his readers well informed of all the chief occurrences of pharmaceutical interest.

In his capacity as Professor of Galenical Pharmacy, Bourquelot was a member of the Permanent Commission of the French Codex, and contributed largely to the preparatory research for the edition of 1908. He was also a delegate to the Congress of Pharmacy in Moscow (1897), in Madrid (1903), Brussels (1910), and The Hague (1913), and to the International Conference in Brussels (1902).

Very characteristic of Bourquelot was his extreme personal modesty. In his private life he was a simple, genial man with a marked aversion to anything approaching a parade of his learning, extensive as that was. In conversation and in discussion with his students he did not by any means confine himself to scientific subjects, but often recounted his experiences in his travels and revived the memory of the many eminent pharmacists with whom he had become acquainted. He remained all his life profoundly devoted to pharmacy, more particularly to scientific pharmacy. He was a steady defender of apprenticeship, which, he was convinced, should be maintained at two years and be precedent to the course of pharmaceutical study. In this he was in agreement with the majority of practical pharmacists and also of such savants as Balard and J. B. Dumas, who repeatedly asserted their belief in the utility of apprenticeship in developing the scientific spirit in young pupils.

The Digestive Ferments.

Bourquelot's first scientific researches dealt with the phenomena of digestion in the cephalopods, and were published in the years 1881-1882. They appear to have had a determining influence on all his subsequent work, for, as he himself says, "I found myself at the outset at grips with the digestive ferments, that is to say, with the soluble, hydrolysing ferments which are the agents of digestion. These researches, in drawing my attention to the part played by soluble ferments in living beings, have, to a certain extent, decided all

my other investigations, which have been extended not only to other hydrolyzing ferments, but also to the principles (sugars, glucosides, etc.) upon which they act, as well as to the study of the soluble oxidizing ferments."

These researches on digestion in the cephalopods, which were utilized by Bourquelot in 1885 as his doctorate thesis, showed that of all the glandular organs appertaining to the digestive system of the cephalopods only two, *viz.*, the liver and the pancreas, secreted a liquid possessing digestive power. The liver furnishes amylase, trypsin and pepsin; the pancreas, diastase. The liver contains glycogen and mucin, like the liver of the higher animals, but it does not contain biliary acids or pigments. Like the pancreas, it contains leucin and tyrosin in considerable quantity; in fact, in the cephalopods, and doubtless in the molluscs generally, there is a concentration of digestivity, whereas in the vertebrates there is division of digestive work which contributes to its greater perfection.

Soluble Ferments.

Partly independently and partly in collaboration with H. Hérissey, Bourquelot discovered a number of new soluble ferments, such as trehalase, which appears to be generally distributed in the fungi, and which converts trehalose into two molecules of glucose; pectosase, which converts pectose into pectin; pectinase, which converts pectin into sugar; seminase, which converts the mannanes and galactanes that compose the horny albumen of seeds into mannose and galactose, etc. He also confirmed the existence of invertin, inulase, maltase, etc., as specific ferments. All these researches contributed to strengthen the opinion that living beings had at their disposal a very large number of these ferments, by which their nourishment was rendered assimilable, and by which the reactions that were carried out in their cells were provoked.

In the course of his experiments on the hydrolyzing ferments of the fungi Bourquelot observed certain phenomena, such as coloration or precipitation in liquids that were originally colorless and clear. This led him to examine them for the oxidizing substances already detected by Schönbein. These proved to be analogous to the soluble hydrolyzing ferments. Those contained in the fungi were shown to be more active than those contained in the phanerogams, and to be capable of oxidizing substances upon which the ferments of the

phanerogams had no action. Bourquelot also showed that there was a difference between those oxidizing ferments or oxidases, properly so called, which exert their action in the presence of oxygen, and those which he called indirect oxidases, which could exert an oxidizing action only in the presence of peroxides, which they were able to decompose, liberating active oxygen.

Investigation of Drugs.

The study of the soluble ferments led Bourquelot to the idea of utilizing them for the purpose of investigating further the constituents present in drugs. This constitutes one of the most original and fertile developments of Bourquelot's work, for it not only led to results of great interest, but furnished chemists with a most valuable means of investigation. Enzymes have the advantage of being more specific in their action than such hydrolyzing agents as the mineral acids, etc. Both sulphuric acid and invertin hydrolyze sucrose, but whereas sulphuric acid hydrolyzes also all the polyoses, the carbohydrates, glucosides, etc., invertin attacks free or combined sucrose only. A positive action by invertin indicates that the sugar liberated is certainly levulose, which was attached either to glucose alone or, by means of glucose, to a larger molecule (gentianose, raffinose, etc.).

Bourquelot directed his efforts chiefly to the biochemical detection of sucrose and glucosides in plants. In order to accomplish this, it was necessary to prevent changes from taking place in the plants after the stage at which their examination was desired. This he effected by throwing the plant little by little into boiling alcohol, and thus stabilizing it. The necessity for such treatment is conspicuously shown by the fungus *Lactarius piperatus*. This, in its natural condition, contains the sugar trehalose; within five hours after collection the trehalose has entirely disappeared and its place been taken by mannite.

Bourquelot examined hundreds of phanerogamous plants by this (the biochemical) method for sucrose, and in no instance did he obtain a negative result. This method is based upon the action of invertin upon the dextrorotatory and non-reducing sucrose, which is transformed into a lævorotatory and reducing mixture of glucose and Levulose. Sucrose, he concluded, was the most widely distributed sugar in plants, and a necessary nutritive princple in all chlorophyll-containing plants, for it was found not only in phanerogams, but also

in a certain number of ferns, horse-tails, etc. On the other hand, fungi contain almost universally trehalose. Bioses are not directly assimilable; to be utilized by the organism they must first be converted into glucose, and this is effected in living beings by a soluble ferment.

Detection of Glucosides.

In a similar manner he utilized emulsin to detect glucosides. In this case the solution that had been employed for the detection of sucrose, and in which this sugar had been completely hydrolyzed, was boiled to destroy the activity of the invertin, cooled, and emulsin added. If a glucoside hydrolyzable by emulsin was present, the reducing power increased and the rotation inclined to the right. Glucosides hydrolyzable by emulsin are always glucose compounds, and are always lævorotatory. In this manner Bourquelot examined 281 species of plants, and in 205 glucosides were found; from 56 they have been actually isolated.

Enzymes in Tinctures.

Bourquelot next directed his attention to the examination of the enzyme action in tinctures, and showed that it was not necessary for the enzyme to be dissolved if the glucoside were in solution and sufficient water were present for the reaction to be completed. Salicin in alcoholic solution was, he found, only partially hydrolyzed, although the enzyme was present in sufficient quantity. On operating upon an alcoholic mixture of glucose and saligenin with emulsin, the glucose was found to combine slowly; it did not, however, combine with the saligenin, but with the ethyl alcohol, forming the ethyl glucoside. This discovery confirmed observations previously made by others, and was followed by the synthesis of a number of other glucosides and also by proof that the enzymes are as specific in their synthesizing action as they are in their hydrolytic.

Bourquelot's researches on the soluble enzymes and the principles upon which they act have found a fertile application in pharmacy. They have led their author to formulate new ideas on the preparation, composition, and preservation of medicaments of vegetable origin, and have thrown light on some of the changes that take place in plants during drying at a low temperature. These plants contain soluble hydrolyzing and oxidizing enzymes; when their vitality is destroyed, their juices mix, and certain principles that they hold in

solution are hydrolyzed or oxidized. If, therefore, the principles actually existing in the plants are to be isolated these enzymes must be rendered inactive, and, since these enzymes retain their activity in alcoholic menstrua, boiling alcohol should be used in the preparation of tinctures from them.

Bourquelot's researches extended over forty years, and were published in upwards of 300 communications to various scientific journals. They have opened up new avenues of investigation, of which scientific workers may be trusted to make full use.

THE SOLUBILITY OF PHENOL IN LIQUID PARAFFIN.*

By Jules Cofman-Nicoresti.

A search has been made through the official Pharmacopœias and other English and foreign pharmaceutical authorities, and, much to the writer's surprise, nowhere was to be found any information as to the solubility of carbolic acid in liquid paraffin.

Martindale's "Extra Pharmacopœia" (Vol 1, 1920, p. 14) gives the solubility of phenol in vaseline as one in twenty, and the United States Dispensatory states that phenol is practically insoluble in cold petroleum-benzine.

To find the approximate solubility of phenol in liquid paraffin, the following experiments were carried out: Solutions from 0.5 per cent. to 10 per cent. were prepared, using Acid. Carbolic. Cryst., B. P., and medicinal liquid paraffin of commerce. The crystals of phenol were rubbed down in a glass mortar, the paraffin added in successive small portions, and the whole transferred to stoppered bottles, which were then placed in hot water to facilitate the solution. When all the phenol had dissolved, the bottles were taken out of the water-bath and kept for twenty-four hours at room-temperature (about 15° C.).

At the end of this time it as observed that: in the bottles containing 0.5 per cent. and 1 per cent. phenol (respectively) the solution was perfectly clear.

The bottle containing 2 per cent. phenol had a few slightly reddish, oily drops of phenol at the bottom of the bottle; while the bottles containing 3 per cent., 4 per cent., 5 per cent., etc., up to 10 per cent. phenol had more of the separated phenol at the bottom of the bot-

*Reprinted from the *Pharm. Jour. and Pharm.*, June, 1922.

tle, the quantity of the separated oily layer being in proportion to the amount of phenol taken.

A further 5 per cent. and 10 per cent. solution was prepared, as described above, but in this case a few grains of menthol was added to the solution. After twenty-four hours standing at 15° C., it was observed that the phenol had crystallized at the bottom of the bottle in fine, white, silky needles.

The conclusions drawn from the above experiments are:

1. The solubility of phenol in liquid paraffin at 15° C. is not above 1 per cent.

2. The quantity of phenol, exceeding 1 per cent., dissolved in liquid paraffin by means of heat will, when cool, separate in a liquid, oily layer, which layer will occupy the lower part of the solution.

Boemingham (*Exper. Cancer.*, December 8, 1921; see *P. J.*, Vol. 108, p. 298) points out the dangers of using liquid paraffin as a substitute for glycerin in phenol solutions. He mentions a case in which a young physician prescribed as ear-drops, for a boy of ten, suffering from ear-ache, liquid phenol in liquid paraffin. A glass dropper was used to administer the drops; the pure phenol collected in the tip of the dropper and was injected in the child's ear, with the result that half the tympanic membrane was destroyed and the external meatus and the auricle very badly corroded.

A similar case came before the law courts in a North town about two years ago. A prescription for ear-drops containing 6.2 per cent. of pure phenol in liquid paraffin had been dispensed by a pharmacist. The patient, after using half of the solution in the bottle (1 ounce bottle), complained of pains in his ears, and suspecting that the prescription had been wrongly dispensed, sent it to an analyst, who found 10.3 per cent. of phenol in the solution.

An action was taken against the chemist for wrongly dispensing the prescription, and in spite of the chemist's defence, the jury, apparently impressed by the analytical evidence, found for the plaintiff, giving heavy damages against the chemist, with the result that the unfortunate pharmacist was sent to the bankruptcy court.

This is another instance which points out clearly that the medical practitioner's knowledge of chemistry and pharmaceutics cannot be trusted, and pharmacists should carefully scrutinize every prescription they take in to dispense.

SCIENTIFIC AND TECHNICAL ABSTRACTS

ADRENALIN TESTS. L. Zechner and F. Wischo.—The authors give results obtained with various adrenaline tests in which the following oxidizing agents which develop characteristic colorations are used: *Ferric chloride:* The optimum concentrations and quantities are: One drop of a 50 per cent. solution for adrenaline solutions of 1:100, 1 drop of a 5 per cent. solution for solutions of 1:1000, 1 drop of a 0.5 per cent. solution for lower concentrations, with, in each case, an optimum temperature of 10 to 15° C. *Potassium dichromate:* One drop of a 5 per cent. solution added to 1 c.c. of 1:1000 adrenaline solution gives colorations ranging from yellow to orange and red, and finally brown, with turbidity and eventually flakes, whereas no turbidity is produced on adding 1 drop of a 0.5 per cent. solution of potassium permanganate. *Potassium permanganate:* One drop of a 0.1 per cent. solution gives a red coloration and is sensitive in dilutions of 1 in 100,000.—(*Pharm. Monatsh.*, 1921, 2, 141-5; *Chem. Abstr.*, 1922, 16, 787.) Through the *Analyst.*

D. G. H.

COMMERCIAL HYDROGEN PEROXIDE CONTAINING PRESERVATIVES. P. Poetschke.—A sample of commercial hydrogen peroxide examined contained 11.75 grains of benzoic acid, 0.93 grains of salicylic acid and 1.28 grains of acetanilide per gallon. Results of tests to determine the efficiency of these substances, separately or together, showed that a mixture of benzoic acid and salicylic acid in the proportions mentioned had a decided preservative effect, and that this was not enhanced by the addition of acetanilide. A mixture of quinine sulphate (2.3 grains) and saccharin (1 grain per gallon) also has a preservative action; the saccharin masks the bitter taste of pure hydrogen peroxide, but does not appear to increase the keeping qualities of the peroxide. Without the addition of quinine sulphate, hydrogen peroxide lost 37 per cent. of its available oxygen in four weeks; when quinine sulphate was present the loss was only 14 per cent. in the same period.—(*J. Ind. Eng. Chem.*, 1922, 14, 181-185.) Through the *Analyst.*

W. D. S.

DETECTION OF VERONAL IN URINE.—According to Zimmerman (*Apoth. Zeit.*, 1921, 35, p. 382) the presence of veronal, luminal, or similar compound in urine may be detected by the following simple method: Two cc. of the urine is mixed with two cc. of ether and shaken; the ether is separated and evaporated on a watch glass. Should veronal be present small rings of minute needle-shaped crystals are formed. A confirmatory test is to disintegrate the rings with a few drops of water and add a drop of a solution of mercuric oxide (1) in nitric acid (2.5) when a turbidity or even a precipitate will be produced.—(Through the *Prescriber.*)

STAIN FOR LEUKOCYTES.—The following solution is recommended by H. B. Cross (*Johns Hopkins Hospital Bulletin*, 32, 1921) for staining leukocytes in exudates:

Distilled water	100 c.c.
Glycerin	20 c.c.
Alcohol (95 per cent.)	20 c.c.
Phenol	2 c.c.

In this dissolve:

Crystal violet	0.06 gram.
Pyronin	0.20 gram.

The stain is ready for use without filtering, and it is stable if protected from sunlight and evaporation. Films are made and allowed to dry in air without heat or other fixation. Staining takes place in five to ten seconds, after which the preparation is washed with distilled water. Any excess of water is mopped up with blotting paper, but the film itself should not be blotted. The cell nuclei are stained violet and the cytoplasm of a uniform delicate lavender, the cell limits being well defined. Bacteria are a deep purple. Erythrocytes appear as pale lavender shadows. Plasma cells and mast cells exhibit a characteristic structure and stain darkly throughout, so that they are easily recognized.

YOHIMBINE BARK.—The difficulty of distinguishing true yohimbine bark from that of numerous similar and allied species which yield alkaloids closely resembling yohimbine, but have different physiological actions, has led to some contradictory accounts of its

chemical and therapeutic properties. The history and botanical characters of different species of *Pausinystalia* and *Corynanthe* are described, and a review is given of the alkaloids prepared from them. Chemical tests of the bark have proved unsatisfactory, for, although the estimation of the total alkaloids is easy, no method for the quantitative separation of yohimbine and yohimbenine has been found. There is much evidence that yohimbine differs, both chemically and pharmacologically, from quebrachine. Genuine yohimbine bark is that of *P. yohimbe,* K. Sch.; this only differs microscopically from *P. macroceras* in the arrangement of the bast fibres and its characteristic punctiform lumen. The genuine bark occurs in channelled pieces, 4 to 10 mm. thick, having a tinge of red in the brown or grey-brown outer and inner surfaces; the outer surface is longitudinally furrowed, with the edges of the furrows not raised above the general level of the surface, there are narrow transverse cracks at intervals of 1 to 2 cm., and the cork adheres closely. Transverse sections under the microscope show characteristic beaded layers of bast fibres alternating with parenchymatous cells with little or no "twinning." Scrapings from the inner surface, when shaken with dilute sodium hydroxide (10 drops of 1.168 sp. gr. in 30 cc. of water), give a red color varying from wine red to reddish brown; dilute ammonia gives the same color more distinctly, but slowly. The false bark from *P. macroceras* has little or no red tinge, and the edges of the longitudinal furrows are puckered, so that they stand up above the general level; the transverse cracks are very irregular, and the cork exfoliates easily. When the bark is treated with alkali, as above, a brown coloration with only a faint tinge of red results. (*Pharm. J.* 1922, 108, 282-285, 311-314.)—(H. E. C., through the *Analyst.*)

MEDICAL AND PHARMACEUTICAL NOTES

AN INCOMPATIBLE LANOLIN CREAM.—

℞	Lanolin	℥i.
	Zinci Oxidi	℥ii.
	Calamine	℥i.
	Aq. Calcis .....ad.	℥vi.

This is a cream with more lime-water than the lanolin can absorb. By adding a few grains of saponin to break up the lanolin and sufficient tragacanth to hold it in suspension, and then the powders and the lime-water gradually, a quite presentable and homogeneous cream is obtained. Sometimes the active substance may be soluble in the hot melted basis and separate out on cooling. For example, soft paraffin with 4 per cent. of carbolic acid on cooling shows crystals of carbolic acid. Such an ointment should be stirred until quite cold. When heat is required in preparing an ointment, only what is absolutely necessary should be employed, and always by means of a water bath, and the ointment should be stirred till almost quite cold.

THE MANNA OF MOSES.—Manna, upon which the Jews fed while wandering in the wilderness with Moses, is explained by Dr. Paul Haupt, instructor in Semitic languages at Johns Hopkins University.

Manna was a nutritive lichen like Iceland moss and the reindeer moss, which, in times of great drought and famine, has served as food for a large number of men in the arid steppes of various countries stretching from Algeria to Tartary, Dr. Haupt declares.

The edible lichens, he said, contained not only starchy substances, but in some cases a small quantity of saccharine matter. It was prepared by grinding the lichen-manna in querns or mortars, mixing it with the honey-like drops which exude from the punctured bark of the tamarisk tree, and baking this mixture.—(*Science Service.*)

ETHYL ALCOHOL MADE FROM WOOD.—People do not generally think of wood as a source of alcohol; that is the grain or ethyl alcohol formerly used for beverage purposes and still of use in perfumes, in manufacturing ether and as a solvent. It is quite possible, however, to make grain alcohol from wood waste through a process described by F. W. Kressman, of the Forest Products Laboratory, Madison, Wis.

This process is outlined in *Department of Agriculture Bulletin 983,* "The Manufacture of Ethyl Alcohol From Wood Waste," just issued. The making of ethyl alcohol from such things as straw,

cotton, wood, and many other plant fibres is not at all new, but previously, except in very few instances, it was not possible to use these materials profitably.

There is wasted annually, Government experts estimate, some fifteen to twenty million tons of wood suitable for the manufacture of ethyl alcohol and capable of yielding about fifteen gallons of alcohol to the ton.

The department bulletin which tells about the manufacture of ethyl alcohol from wood waste may be obtained from the United States Department of Agriculture, Washington, D. C.

START CAMPAIGN TO MAKE CRUDE DRUGS CLEANER.—A campaign to eliminate excessive dirt from crude drugs has been started by the Bureau of Chemistry, United States Department of Agriculture, which is charged with the enforcement of the Federal Food and Drugs Act.

An investigation by the bureau shows that the shipping of dirty domestic crude drugs is a rather widespread practice and is due largely to carelessness in gathering. Excessive dirt constitutes adulteration in crude drugs shipped within the jurisdiction of the Federal Food and Drugs Act. In some instances crude drugs were found to contain 20 per cent. or more of dirt.

This practice results not only in an economic loss to the purchaser who usually buys the crude drugs by weight, but obviously lessens the medicinal value of the drug. This condition may be dangerous to the user, restrict the sale of the drug, and consequently lower its marke value. Care on the part of the gatherers would prevent this great excess of dirt. The dealer who ships the crude drugs into interstate commerce is responsible under the Federal Food and Drugs Act and should take steps, say the officials, to correct this condition in order to free himself from liability to prosecution.

Ordinary care such as is exercised in marketing garden products such as carrots, turnips or spinach is usually sufficient. For instance, the washing of the fibrous roots such a goldenseal or unicorn root, before drying would materially improve exiting conditions, in the opinion of the bureau. Inspectors have been directed to give special attention to shipments of crude drugs. Appropriate action under the Federal Food and Drugs Act will be taken in all cases found to be in violation of the law, it is said.

FRANCE MAY ENFORCE USE OF ALCOHOL (AS A MOTOR FUEL).—France contemplates compelling motorists to use new substitutes for gasoline to reduce her dependency on other countries for mineral oils.

Consul Wesley Frost, at Marseilles, reports to the Department of Commerce that the French government is contemplating the enforced use as motor fuel of a new mixture composed of alcohol, gasoline, cyclohexanol and phenol, partly in order to dispose of great accumulations of alcohol and partly to reduce the country's dependency for mineral oils on the United States, Great Britain and Holland. As a result of extensive experiments a "carburant national," as it is called, has been developed, the practical value of which is claimed to have been proven by tests. The formula is: Gasolin, 900; alcohol at 95°, 100; cyclohexanol, 17.5; phenol, 37.5.

Various interests have been attempting to find an assured market for the alcohol distilled from sugar beets, surplus wines, and vegetable products. The quantities of such alcohol produced in any year fluctuate, and the growers would like to be assured against over-production by an arrangement which would always enable them to convert their surplus into alcohol at remunerative prices. The solution which has been hit upon for disposing of the excess stocks of alcohol and providing a regular market for alcohol in the future is the enforced use of alcohol as an adulterant of gasoline.

The difficulties have hitherto been that the price of the alcohol has been somewhat higher than the price of gasoline so that the resulting mixture would be somewhat more expensive than gasoline. Under the terms of the Beziers Concordat, the French Government would establish a national alcohol office possessing a monopoly of the purchase and sale of alcohol; and this office would produce the carburant national. It would be subsidized by a tax of one franc per hectoliter on all wine marketed in France and of 50 centimes per hectoliter on all cider marketed. It is claimed that the resulting funds could be used to reduce the price of alcohol to such an extent that consumers of the new mixture would not suffer financially. It would thus appear that the wine and cider consumers of France would ultimately pay in the shape of a slightly increased price of wine for a subsidy which would keep the alcohol industry afloat, and would diminish by at least 10 per cent. the French importations of gasoline.

The movement appears to be politically very strong, and there is said to be a possibility that legislation will be enacted which will result in the replacing of gasoline throughout France by a mixture containing 90 per cent. gasoline and 10 per cent. alcohol. The weakest point in the project seems to be the amount of the wine tax, which would be necessary to reduce the price of alcohol to a level with that of gasoline. The contemplated tax might not yield a sum sufficient to provide the subsidy.

SOLID EXTRACTS

An old herbalist formulary states that a necklace of peony seeds will cure epilepsy; that unguentum sympatheticum made of the moss growing on a dead man's skull is a sovereign weapon-salve; that if children three months old are bathed in a decoction of wormwood they will never feel heat or cold; that rue planted among sage protects it from the poison of toads; that grapes will not keep in the same house with quinces.

A combination weed killer and lawn fertilizer of unusual value is furnished in the following mixture: 25 parts each of chloride of potash, and sulphate of ammonium with 40 parts of "superphosphate." The usual amount prescribed for each acre of lawn is about 900 pounds of the mixture.

Injections of an extract of the poison-ivy leaf are now used to protect persons who are sensitive to this powerful toxic agent. This treatment as stated to be practically specific when it is properly indulged in.

The treatment of disease by sunlight was systematically practiced by Hippocrates, the father of medicine, but it was not until 1903 that the first clinic of heliotherapy of surgical tuberculosis was opened by A. Rollier.

That the beautiful, useless butterfly may be the deliverer of mankind from the scourge of tuberculosis is the claim of the French bacteriologist, Metalnikow in a report of his investigations which he has just presented to the Pasteur Institute. His researches have not yet been carried far enough to make any definite conclusion but he declares that he believes himself to be on the track of a very important discovery and has asked the help of other scientists to study along the lines he has begun.

Talc, the soft rock used in making talcum powder, may also be contained in the paper of your magazine, the rubber in your auto tires, and the china on your table.

Among the 180 different kinds of bacteria and other organisms taken

from the bodies of house flies by different investigators are infantile diarrhœa, typhoid fever, anthrax, food poisoning, amœbic dysentery, abscesses, leprosy, tape worms, hook worms, bubonic plague, conjunctivitis, summer complaint, tuberculosis, gonorrhœa, green pus, enteritis, trachoma, erysipelas, gas gangrene, stomach worms, pin worms, ophthalmia.

Though attempts at the isolation of the infective agent in vaccine for smallpox have failed, Dr. W. G. MacCallum of Johns Hopkins University declared to the National Academy of Sciences that it can be separated from most contaminating material if the vaccine is suspended in a fluid of appropriate specific gravity and centrifuged. The infective material in vaccine lymph rises to the top in a fluid of specific gravity 1.16 and sinks to the bottom in any fluid of specific gravity lower than 1.13.

Iron which has been in contact with saline, acidulous and alkaline waters or soil for some length of time sometimes becomes so soft that it can be whittled with a jack-knife.

Blood transfusion first performed in man in 1667 is referred to in Samuel Pepys' diary for November 21 and 30 of that year.

As the evidence piles up, it seems more and more probable that carbontetrachloride, which is commonly used as a clothes cleaner, will prove to be a cheap, agreeable and effective treatment for the hookworm parasite that is destroying health and reducing human efficiency in millions of people in many parts of the world, including many thousands in our Southern States.

THE NINETY-NINTH ANNUAL COMMENCEMENT OF THE PHILADELPHIA COLLEGE OF PHARMACY AND SCIENCE.

The Commencement Exercises were held Wednesday morning, June 7th, at the Academy of Music.

The graduation address was delivered by Dr. Victor C. Vaughan, a member of the National Research Council. (See this Journal, July, 1922.) Dr. Vaughan in his parting message to the graduates impressed them with the need for specializing along selected lines and pointed to them the vast opportunities for real research which true Pharmacy provides. The President of the College, Admiral W. C. Braisted, awarded degrees as follows:

The honorary degree of Master of Pharmacy was conferred upon Mr. Samuel C. Henry, for many years a trustee of the College, and now secretary of the National Association of Retail Drug-

gists; upon Professor J. A. Koch, dean of the Pittsburgh College of Pharmacy, president-elect of the American Pharmaceutical Association; upon Ambrose Hunsberger, recording secretary of the Philadelphia College of Pharmacy and Science, and president of the National Association of Retail Druggists; and upon Dr. Henry H. Rusby, dean of the New York College of Pharmacy, and a noted botanist and explorer, recently returned from explorations in South America, having served as the director of the expedition equipped by the H. K. Mulford Company, to search for new medicinal plants.

Degrees in course were then conferred as follows:

Bachelor of Science in Pharmacy and Chemistry (B. Sc.)

Hollis McCarroll Wible.

Doctor in Pharmacy (P. D.)

Jacob Homer Tyson (P. C. 1917).

Pharmaceutical Chemist (Ph. C.)

Archie Lee Caldwell, Edgar Clarence Knight, Eduardo Palomeque, Charles Clifton Pines, Paul S. Roeder.

Bachelor in Pharmacy (Phar. B.)

Sara Brown, Mildred Frances Carlisle, Anne Goldberg, John Leroy Paul, William R. Woods.

Of the Ph. G. Class, the following were awarded the degree, and received their diplomas:

Graduate in Pharmacy (Ph. G.)

George Dent Adamson, Hossein Amin, John Richmond Baker, Anna Baylin, Lester Marble Bergh, Gerson Bergman, Esther Bernholz, Max Louis Bliss, John Benjamin Blumenfeld, Louis Blumenfield, Nathan Blumenfield, Hyman C. Bogash, Nathan Brenner, Samuel Edward Brian, May Bright, Samuel Cohen, Leslie R. Colestock, Walter Samuel Courson, Edward James Cowman, Francis

Joseph Coyne, Judson Newell Davids, Thomas Leonard Davis, James Joseph Deeney, Raymond Edw. Dersch, Howard Amos Dinstel, Herbert Carlisle Dixon, Austin Paul Dombroski, William Howell Duncan, Martin J. Dwyer, Jr., Herman Elgart, Meyer Elgart, Nathan Finberg, James Vernon Fisher, Abraham Fleisher, Julius Fomalont, Louis Forman, James Gilbert Frazer, Digno Rincon Garcia, Michael Joseph Garman, Herman M. Ginsburg, Carlton Joseph Goodman, Ephraim H. Goodman, Rose Gratz, Rudolph Luther Green, Jacob Greenblatt, Norman Cornelius Greig, Michael Angelo Grieco, John Samuel Griffith, Selig Gross, Frank Wilson Hissong, Oscar Ericson Hysore, Max Jerome Kaliner, Morris Kaplan, John Patrick Kelly, Charles McFarland Kelly, Joseph Francis Kennedy, George Kimmelman, Sterling John Koehler, Jacob Joseph Kotzin, David Kovarsky, William Charles Kramer, Florence S. Kurlancheek, Alexander H. Lackey, Nathaniel J. Levitt, Aaron Lichtin, Harry Lisker, Rebecca Clara Litvackoff, Samuel Solomon London, Ray R. Losh, Jacob Leo Menaker, Attilio Olindo Miceli, George Alvin Miller, Joseph Emerson Miller, Max Leon Miller, Samuel Minzes, Matthew Molitch, Jacob Mones, John Lloyd Moonly, Howard A. Mummaw, Frank Mustaro, Walter Niklewski, Harry Nussbaum, William H. Orland, Isaac W. W. Parsons, Clarence Eugene Phillips, Robert G. B. Phillips, Anna Belle Polakoff, Israel Joseph Possoff, Samuel Raphael Price, Nathan David Promish, Robert Samuel Racier, Estelle Zeror Ralston, Morris Richter, Frederick R. Rogers, Fannie Phyllis Root, Samuel Rose, Joseph Rubin, Joseph Richard Sandler, Samuel Schlichter, Louis Schwartz, Maurice J. Schwartzman, Harry Shapiro, Isadore Sherman, Alvin Clarence Smith, John Wilson Smith, Paul Eugene Smith, Richard Allyn Smith, Louis Steinberg, Emanuel Stephanides, Norris Emrie Stetz, Bryant Da Costa Stroup, Harold Woods Tate, Mrs. Marion Walton, Ralph Isadore Weinstock, Jacob Berman Winer, Jacob Paul Wingert, Benjamin Zebalsky, Joseph Jacob Zonies, Samuel Louis Weinstock.

The following had met all scholastic graduation requirements, but will not receive their diploma until they have reached legal majority:

Thomas Ebert ailey, Hugh Clifton De Hoff, Carl Wilson Gruver, John Forry Hinkle, John Eugene Larkin, Frederick C.

A. Luebert, Nathan Barnett Raich, Victor Louis Rudolph, Louis Schildkraut, Brainerd Herbert Shull, Frank Harold Smoker, Ralph R. Umsted, Louis W. Wasserman, Clarence James Wilson, John Russell Winslow, Charles V. Woodruff.

Those whose diplomas will be released when they present evidence of having met in full the "practical experience requirement" are:

Charles S. Abramson, George Mason Andrews, Eva Boodis, Rose Cann, Benjamin Samuel Cotler, Herbert James Davis, Anna Dershawetz, Louis Herman DeVine, Norman Levi Dietz, Luke Kendig Eberly, William Henry Friedrich, Morris Greengross, George W. Groninger, Charles Edward Harris, Elizabeth Augusta Helm, Louis Kauffman, Noel Sponsler Kohr, Charles Leibowitz, Charles Francis Lisi, Maxwell E. Madres, Philip Simon Moses, Mary Edna Nedzinskas, Morris Louis Pasker, Bertha Passon, Zelda Perez, Courtland Fell Quinby, Nicholas Peter Rossi, William Andrew Shaw, Simon Shute, Elizabeth Acton Test, Jacob Yastrov.

Certificate of Proficiency in Chemistry

The following students having completed the prescribed Technical Chemistry Course of three college years, comprising ten months each, with a roster of five and one-half days a week, were awarded the Certificate of Proficiency in Chemistry:

Clarence Carl Conold, John Russel Fisher, Royce W. McGaughey, Morris Chalfant Matt, Jonas Gilbert Maust, Evan Laurie Rhoads, Harry H. Shull.

Candidates who have completed special courses, and have qualified for certificates:

Certificate in Bacteriology.

Cora Eleanor Allen, Harry Althouse, Russell T. Blackwood, Jr., Donald Charles Butts, Jacob Greenblatt, Joseph Hunt, Morris Kohen, Morris H. Johnston, Vance Howard McVey, Margaret M. Matthews, Louis A. Mestre, John Dickson Oyler, Philip Harrington Polio, Francis Joseph D'Rewal, Evan Laurie Rhoads, Stanley W. Rosenfeld, Porfirio Solorzano.

Certificate in Clinical Chemistry.

Donald Charles Butts, Clarence Carl Conold, Joseph Hunt, John Frederick McGinnis, Louis A. Mestre, John Dickson Oyler, Philip Harrington Polio, Evan Laurie Rhoads.

Certificate in Physiological Assaying.

Marcus Allen Blair, Jr., Carlos Weldon Riblet, Charles Franklin Slotter, Irwin I. Sofronski.

Certificate in Perfumery and Cosmetics.

Evan Laurie Rhoads, Victor L. Rudolph.

Certificate in Advanced Pharmacognosy.

Maurice Bern.

Certificate in Advertising and Salesmanship.

Parker B. Creep, William A. Chamberlin, Helen Hoey, George M. Andrews.

Certificate in Commercial Law.

Edgar P. Swank, Paul William Hughes, W. F. Estlack.

Summary.

Degrees.

Master in Pharmacy (Ph. M.) (Honorary)	4
Bachelor of Science (B. Sc.)	1
Doctor in Pharmacy (P. D.)	1
Pharmaceutical Chemist (Ph. C.)	5
Bachelor in Pharmacy (Phar. B.)	5
Graduate in Pharmacy (Ph. G.)	166
	182

Certificates.

Proficiency in Chemistry	7
Certificate in Bacteriology	17
Certificate in Clinical Chemistry	8
Certificate in Physiologic Assaying	4
Certificate in Perfumery and Cosmetics	2
Certificate in Advanced Pharmacognosy	1
Certificate in Advertising and Salesmanship	4
Certificate in Commercial Law	3
	46

The award of prizes was then announced as follows:

Distinguished.

Gerson Bergman, James Joseph Deeney, Rose Gratz, Rudolph Luther Green, Joseph Rubin.

Meritorious.

Esther Bernholz, Austin Paul Dombrowski, James Gilbert Frazer, Michael Joseph Garman, Carl Wilson Gruver, Jacob Greenblatt, Elizabeth Augusta Helm, Oscar Ericson Hysore, Florence Sylvia Kurlancheek, Rebecca Clara Litvackoff, Frederick Charles August Luebert, Maxwell Emanuel Madres, Attilio Olindo Miceli, Matthew Molitch, Morris Pasker, Nathan David Promish, Robert Samuel Racier, Fannie Phyllis Root, Samuel Schlichter, Louis Schwartz, Frank Harold Smoker, Morris Emrie Stetz, Louis William Wasserman, John Russell Winslow.

The *Procter Prize,* a gold medal and certificate, for the highest general average of the class, was awarded to Joseph Rubin.

The *William B. Webb Memorial Prize,* a gold medal and certificate, offered for the highest general average in the branches of Operative Pharmacy, Analytical Chemistry, and Pharmacognosy, was awarded to Elizabeth Augusta Helm.

The *Remington Memorial Prize,* $20.00, offered by the Estate of Professor Joseph P. Remington, for the highest general average in the examinations in Operative Pharmacy and Dispensing, was awarded to Mrs. Marion Walton.

The *Commercial Pharmacy Prize,* $20.00, offered by Professors E. Fullerton Cook, Robert P. Fischelis, Howard Kirk and C. A. Wesp, for the highest general average in Commercial Pharmacy, was awarded to Robert Samuel Racier.

The *Mahlon N. Kline Pharmacy Prize,* a Troemner Prescription Balance, offered by the Mahlon N. Kline Estate, for the highest general average in Theory and Practice of Pharmacy, was awarded to Attilio Olindo Miceli.

The *Bacteriology Prize,* $25.00, offered by the H. K. Mulford Company, for the highest general average in Bacteriology and Serum Therapy, was awarded to Jacob Greenblatt.

The *James J. Ottinger Prize,* $25.00, offered by Miss Elizabeth H. Ottinger, in memory of her father, James J. Ottinger, Ph. G.,

Class of 1870, for the highest general average, with not less than 90 per cent. in each branch, in Pharmacy, Operative Pharmacy, Chemistry, and Materia Medica, was awarded to Gerson Bergman.

The *Maisch Botany Prize,* $20.00, offered by Joseph Jacobs, Ph. G., Phar. D., Atlanta, Ga., for the best herbarium collection of plants, was awarded to Hossein Amin.

The *Pharmacy Review Prize,* one year's membership in the American Pharmaceutical Association, offered by Ivor Griffith, Ph. M., for the highest general average in Theory and Practice of Pharmacy in the Senior Year, was awarded to Attilio Olindo Miceli.

Prizes for Post-Graduate Courses.

The *Advanced Pharmacy Prize,* ten dollars' worth of books, offered by Professor Charles H. LaWall, for the highest grade in Advanced Pharmacy in either the Ph. C. or the Phar. B. Course, was awarded to Anne Goldberg.

The *J. B. Moore Memorial Prize,* $25,00 in gold, offered by the Rev. J. J. Joyce Moore and Mrs. H. H. Watkins, Jr., in memory of their father, J. B. Moore, to the member of the graduating class presenting the best thesis representing work in the Department of Pharmacy, awarded to Anne Goldberg.

The *Chemical Control Prize,* a year's membership in the American Chemical Society, offered by Charles E. Vanderkleed, for the highest general average in Chemical Control in the Third Year of either the Ph. C. or the Technical Chemistry Course, was awarded to Morris Chalfant Matt.

Prizes Awarded by the Alumni Association.

The *Alumni Gold Medal,* for the highest general average, for all branches in the Senior Year, was awarded to Joseph Rubin.

The *Alumni Prize Certificates,* for the hightest general averages in individual branches in the Senior Year, were awarded as follows: Pharmacy, to Attilio O. Miceli; General Chemistry, to Joseph Rubin; Materia Medica, to Joseph Rubin; Operative Pharmacy, to Marion Walton; Analytical Chemistry, to Elizabeth Augusta Helm; Pharmacognosy, to Hossein Amin; Commercial Pharmacy, to Robert S. Racier.

Prizes Awarded to Under-Graduate Students.

The *Alumni Silver Medal,* offered by the Alumni Association, for the highest average in all branches in the Junior Year, was awarded to Bernard Nichols.

The *Pharmaceutical Arithmetic Prize,* books to the value of $5.00, offered by Ivor Griffith, Ph. M., for the highest general average in Pharmaceutical Arithmetic in the Junior Year, was awarded to Harry Charles Molitz.

NEWS ITEMS AND PERSONAL NOTES

THE AMERICAN PHARMACEUTICAL MANUFACTURERS' ASSOCIATION ELECTS OFFICERS FOR 1922-23.—The following officers and directors for the ensuing year were elected: President, Mr. George C. Pratt, of the National Drug Company, Philadelphia, Pa.; first vice-president, Mr. G. A. Kinsel, of The Harvey Company, Saratoga Springs, N. Y.; second vice-president, Mr. George Flint, of the Flint-Eaton Company, Decatur, Ill.; secretary-treasurer, Mr. Ralph R. Patch, of the E. L. Patch Company, Stoneham, Mass.

It was voted to hold the next meeting of the A. P. M. A. at Altamonte Springs, Fla., March 19, 1923.

PRIZE-WINNERS AT THE ANNUAL P. P. A. MEETING.—The $20 gold prize, which is annually awarded for the best paper presented to the previous annual meeting was awarded to George E. Ewe for his paper on "Weights and Measures."

A prize of $5 for the best commercial paper read at this meeting was awarded to Benjamin F. Hoffstein for his paper on "Do You Sell or Keep Spices?"

A similar prize for the most useful paper, was awarded to W. L. Cliffe for his paper on "A Stable Elixir of Iron of Quinine and Strychnine Phosphate."

An absorbing story of the successful search for strange narcotics and new drugs which may prove of invaluable aid in the treatment

of human diseases, and the determining of the botanical sources of both the genuine and spurious forms of certain drugs already partially known, was told by Dr. H. H. Rusby at a recent dinner given to the returned members of the Mulford Biological Exploration, by the H. K. Mulford Company, at the Manufacturers' Club, Philadelphia.

Originally planned only as a personal testimonial to Dr. Rusby and his associates, who had carried out the work of the expedition with so much enthusiasm and in spite of dangers and discouragements, it developed into one of the most significant gatherings of scientists.

In addition to the guests of honor, there were present some fifty men, leaders in medicine, pharmacy, botany, zoology, as well as captains of industry.

P. C. P. Alumni Please Take Notice.—P. C. P. Alumni who are going to attend A. Ph. A. meeting in Cleveland are requested to notify Lewis C. Hopp, PCP 1875, President Northern Alumni P. C. P., 10110 Euclid Avenue, Cleveland, Ohio. This is to be done immediately.

BOOK REVIEWS

A Guide to the Poisonous Plants and Weed Seeds of Canada and the Northern United States. By R. B. Thomson and H. B. Sifton. 169 pages. 14 x 19.5 cm. University of Toronto, 1922.

In the preface the authors say: "The primary reason for this publication is the long-felt need of a text-book to accompany the course on poisonous plants which is given the students of the Ontario Veterinary College. This object has been kept constantly in mind. It has necessitated the preparation of a book at a price within the reach of every student, and yet one that contains in easily available form an up-to-date knowledge of our common poisonous plants, the characteristics by which they may be recognized, the symptoms produced by them and the remedial treatment required."

"To facilitate the determination of the plant responsible in a

given case of poisoning, the book has been divided into four sections. In the first three are included the plants that are mainly responsible for fatalities among animals. These are grouped on the basis of their source in the animal's feed, whether found in hay (Section I), in pasture (Section II), or in concentrated feedstuffs (Section III)." Section IV deals with poisonous plants which are rarely observed to cause death in animals.

The book is written in simple, non-technical language, which makes it very readable. There are a few objectionable features about it, however, which will seriously impair its usefulness. The arrangement of the subject matter into the four sections stated above is not the best form in which to present the subject. It necessitated repeated mention of the same plant inasmuch as many plants are equally dangerous in the pasture or in hay. A short section, such as forms the table of contents, grouping the plants dangerous under the different conditions together with a few words of explanation, is all that is necessary to convey the information. The result of the present arrangement is that *Zygadenus elegans* is described on page 38, and *Z. venenosus* on page 50; *Eupatorium urticæfolium* is given a brief treatment on page 45 under Hay and Fodder and more extended consideration on pages 85-89 under Pasture and Range. The lupines, which are very dangerous on the open range or pasture, are treated only under Hay and Fodder. There are some misconceptions of fact here and there. On page 43, in discussing the subject of lupinosis it is intimated that *Lupinus luteus* is less poisonous than other lupines on account of its smaller alkaloidal content. The yellow lupine is not less toxic in spite of the smaller proportion of alkaloids present. The fact is that this species is one of the few lupines in which the comparatively very toxic sparteine occurs. On page 58 the two alkaloids, delphinine and staphisagrine, are mentioned as the principal toxic constituents of the native larkspurs. Neither of these alkaloids has been found in any of the American species of Delphinium. On page 69 it is stated that "No satisfactory cure has been found for loco disease." The decidedly beneficial results from treating locoed cattle with strychnine and locoed horses with Fowler's solution were published by Dr. C. D. Marsh in 1909. The authors cannot be excused for the bare statement (p. 71), "Barium salts have been suspected as the toxic substance of the Loco Weeds." The barium notion was exploded ten years ago. The figures in the

text are very good; mention should be made, however, of the fact that the illustration on page 87, which purports to be a picture of White Snakeroot (*E. urticæfolium*) is really *Eupatorium purpureum*, or Joe Pye Weed. The constant reference to the use of Potassium permanganate as a remedy is objectionable; that substance has been shown to have very limited applications and probably is worthless where ruminants are concerned.

The book is well indexed and the printing and binding are excellent. A symptoms key to the principal poisonous plants is appended which will be of assistance in making diagnoses of cases of poisoning. There is included a short glossary, which will be useful. The definition of "toxin," however, "A poisonous substance produced in diseased or decaying tissues," is inexact.

JAMES F. COUCH.

AMERICAN RESEARCH CHEMICALS. New Edition.

The compilation of research chemicals which was prepared by Clarence J. West for the Committee on Research Chemicals of the American Chemical Society and the Research Information Service of the National Research Council has just been issued in revised form as Number 35 of the "Reprint and Circular Series" of the National Research Council. The marked advance shown by the American chemical industry during the last few years is evidenced by the surprisingly large number of high grade chemicals listed in this publication as now purchasable from American manufacturers. The so-called "heavy chemicals" have been omitted because there are so many recognized manufacturers and dealers from whom they may be secured. For the same reason practically all inorganic salts are omitted.

Nearly three hundred research chemicals, not included in the first edition, have been added in this revised list. Many additions have also been made to the list of biological stains and indicators, while a list of dyes that have been carefully purified for use as vital stains has been added. The list of hydrogen ion indicators has been very much extended and a chart of these showing the hydrogen ion concentration range added.

It is recognized that the list may have shortcomings and constructive criticisms and additions will be welcomed. Those interested in this booklet may secure a copy from the Research Information Service, National Research Council, Washington, D. C.

NEUE ARZNEIMITTEL UND PHARMAZEUTISCHE SPEZIALITAETEN. Von G. Arends, Apotheker, 6 vermehrte und verbesserte Auflage, neu bearbeitet von Prof. Dr. O. Keller. 578 pp. gebunden $1.60. Julius Springer, Berlin, 1922.

The pharmaceutical and medical profession in the United States can be justly proud upon the New and Non-official Remedies published annually by the American Medical Association. While this volume only contains those remedies approved by the Council of Pharmacy and Chemistry, Germany, can boast of a book which contains all of the new remedies, pharmaceutical specialities, new drugs, biologicals and even substitutes, or as the referee prefers to call these "parallel preparations."

The first volume of "New Remedies and Pharmaceutical Specialties" was compiled by Georg Arends, a well-known apothecary and pharmaceutical writer in 1903. Since the fifth edition in 1919, Prof. Dr. O. Keller, of the University of Jena, has edited the book. The new edition has been enlarged to 578 pages and is compiled in the usual very thorough German style. Six pages are devoted to Father Kneipp remedies, four pages to Radium and three pages to Digitalis preparations. The digitalis principles are fully enumerated *i. e.*, Digalen, Digitalein, Digitalin Schmiedeberg, Digitalinum pur. amorph., gallicum and Homolle, Digitaline chloroformique, Digitalinum pur. pulv. germanic, Digitalinum cryst., Digitalinum verum, Digitonin Kiliani and Schmiedeberg, Digitoxin cryst. Merck, Digitoxin cryst. comprim., Digitoxin solubile and Gitalin. This enumeration may also well serve as a good example of the confusing similarity of pharmaceutical nomenclature, which may lead to serious errors, in fact, loss of life.

The paper, printing and binding are in first-class style, as can be expected from the well-known publishers, Julius Springer, in Berlin, who are famous for their pharmaceutical publications. Arends-Keller's Neue Arzneimittel will be of great help not only to editors, research workers and pharmaceutical chemists, but also to the prac-

tical pharmacists behind the prescription counter. It is to be hoped that the book will also become better known in pharmaceutical circles in the United States.

OTTO RAUBENHEIMER, Ph. M.

DAS OPIUM. Seine Kultur und Verwertung im Handel. Von Axel Jermstad, Ph. D. Duodecimo, 208 pp. Vienna and Leipzig, A. Hartleben's Verlag.

The well-known publishers issue a chemical-technical library in which the present book is volume 368. Prof. Dr. Heinrich Zörnig, director of the pharmaceutical institute of the University of Basel, was good enough to write an introduction to this book. Jermstad was one of his students and prepared his thesis for his doctorate under Zörnig's direction.

How well this monograph on opium is written can be seen by the outline of its contents: I, Historical; II, Geography; III, Cultivation of Opium in Asia Minor, Macedonia, Persia, India, Egypt and China; IV, Experimental Cultivation of Opium in Algeria, Australia, Bulgaria, Denmark, Germany, England, France, Greece, Holland, Italy, Japan, Java, Norway, Austria, Poland, Russia, Sweden, Switzerland, Serbia, Spain, South Africa, Turkestan, Hungary and United States.

The entire monograph is prepared in a very thorough manner, which reflects with honor the excellent training which Dr. Jermstad has received. The author has consulted the pharmaceutical literature of the world, including the AMERICAN JOURNAL OF PHARMACY. We can highly recommend this book.

OTTO RAUBENHEIMER, Ph. M.